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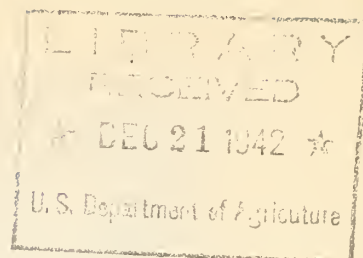
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UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Administration
Bureau of Animal Industry



WARTIME FEED MIXTURES FOR POULTRY

As a result of the war, many feedstuffs that have been commonly used in feed mixtures for poultry have become scarce or even unavailable in some sections of the country, and others have at times become too costly to use. On the other hand, there are unusually large supplies of a few feedstuffs. Also, there are now available some valuable and comparatively new feedstuffs which many poultrymen have not used before.

Among the more important feedstuffs that have become scarce are fish meal and meat scrap. At times dried skim milk and dried buttermilk have commanded such high prices, because of their value as human food, that they were almost too expensive to use in feeding poultry. Fortunately, however, available supplies of these two milk products have been increasing and their prices have tended to become more in line with those of other feedstuffs. Among the feedstuffs of which there are unusually large supplies are the oil-seed meals, especially soybean meal, and wheat. Some of the newer feedstuffs that are finding a valuable place in the wartime feeding of poultry are dried distillers' solubles and other fermentation products and byproducts of high riboflavin content.

The purpose of this publication is to suggest (1) substitutes for fish meal, meat scrap, and dried skim milk and (2) formulas of feed mixtures that make the maximum use of wheat and soybean meal. The substitutes can be used successfully in all-mash starting-and-growing diets that contain at least 21 percent of protein and in all-mash laying diets that contain at least 16 percent of protein. In all-mash starting-and-growing diets that contain appreciably less than 21 percent of protein and in all-mash laying diets that contain less than 16 percent of protein, at least 20 percent of the total protein should be derived from animal sources. Only properly cooked, or heat-treated, soybean meal should be used in feed mixtures that are to contain large quantities of this feedstuff. It is not feasible for the poultryman or small feed mixer to cook soybean meal. Therefore, only those meals that are guaranteed by the manufacturer to be cooked, or heat-treated, should be used.

It is recommended that poultrymen make the maximum use of sunshine and good grass range. Sunshine is the cheapest source of vitamin D, and fresh green feed, especially short, young grass, is an excellent source of all the other known vitamins. Chickens on good range are not likely to suffer from vitamin deficiency.



Feed mixtures made according to the formulas in tables 2 to 7 will contain all the calcium chickens and turkeys require. Accordingly, it is both unnecessary and undesirable to supply additional calcium in the form of limestone or oystershell grit. There is, however, no objection to the use of insoluble grit. In fact, for chickens or turkeys that are confined or, for some other reason, are unable to pick up small stones and pebbles, it is worth while to provide a small quantity of insoluble grit at regular intervals.

It should be kept in mind that the substitutes for fish meal, meat scrap, and dried skim milk given in table 1 and the feed mixtures given in tables 2 to 7 were formulated to meet the current situation in which stocks of fish meal, meat scrap, and dried skim milk are comparatively small and stocks of wheat and soybean meal unusually large. Therefore, many of the feed mixtures are not so good as can be made under more normal conditions. However, they are comparatively cheap and will give satisfactory results. At the United States Department of Agriculture, Beltsville Research Center, Beltsville, Maryland, in experiments in which feed mixtures of this type were fed, the average live weight of Rhode Island Red chickens--in groups that contained approximately equal numbers of both sexes--was about 750 grams, or a little more than 1 pound 10 ounces, at 10 weeks of age. The average live weight of Beltsville Small White poults at 8 weeks of age was about 900 grams, or nearly 2 pounds.

Footnotes to tables 2, 3, 4, 5, 6, and 7

- 1/ Only cooked, or heat-treated, soybean meal should be used in these diets.
- 2/ An alfalfa leaf meal that contains not less than 90,000 I. U. of vitamin A activity per pound is preferred; one that contains less than 45,000 I. U. per pound should not be used.
- 3/ Or other fermentation byproduct or product that contains at least 15,000 micrograms of riboflavin per pound. Dried whey may also be used in place of dried distillers' solubles. It contains somewhat less riboflavin and protein than some lots of dried distillers' solubles, but its protein has a much higher biological value.
- 4/ A mixture of 100 pounds of common salt and 5 pounds of technical, anhydrous manganous sulfate.
- 5/ The standard commercial product is recommended. If this is not available, ordinary salt may be used.
- 6/ The vitamin-A-and-D feeding oil should contain 400 A.O.A.C. chick units of vitamin D per gram. Its vitamin A content is not important so long as the alfalfa leaf meal contains at least 45,000 I.U. of vitamin A activity per gram. If vitamin-A-and-D feeding oil is not available, a quantity of "D"-activated animal sterol that supplies the same quantity of vitamin D may be used.



Table 1.--Suggested substitutes for fish meal, meat scrap, and dried skim milk.

Ingredient	Substitutes for fish meal		Substitutes for meat scrap		Substitutes for dried skim milk				
	1	2	3	4	5	6	7	8	9
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Soybean meal (cooked, or heat-treated) Steamed bonemeal Dried distillers' solubles ^{1/} Dried whey Dried skim milk Fish meal Iodized salt ^{2/}	89	87	86	78	75	73	60	50	--
	5	5	5	13	13	13	--	--	--
	4	--	--	7	--	--	39	--	50
	--	6	--	--	10	--	--	50	--
	--	--	7	--	--	12	--	--	--
	--	--	--	--	--	--	--	--	50
	2	2	2	2	2	2	1	--	--
	100	100	100	100	100	100	100	100	100
Total	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Quantity required to replace 1 pound of fish meal, meat scrap, or dried skim milk and enough ground grain to keep unchanged the total weight of the feed mixture in which the substitution is made ^{3/}	2.5	2.5	2.5	2.0	2.0	2.0	2.0	2.0	1.0

^{1/} Or other fermentation byproduct or product that contains at least 15,000 micrograms of riboflavin per pound.

^{2/} The standard commercial product is recommended.

^{3/} Thus, 2.5 pounds of any one of substitutes 1, 2, and 3 will replace 1 pound of fish meal and 1.5 pounds of ground grain; 2 pounds of any one of substitutes 4, 5, and 6 will replace 1 pound of meat scrap and 1 pound of ground grain; 2 pounds of either substitute 7 or substitute 8 will replace 1 pound of dried skim milk and 1 pound of ground grain; and 1 pound of substitute 9 will replace 1 pound of dried skim milk.

Table 2.--Suggested all-mash starting-and-growing diets for chickens.

Ingredient	Diet 1	Diet 2	Diet 3	Diet 4	Diet 5	Diet 6	Diet 7
	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Wheat, freshly ground	50.0	50.0	51.0	47.7	51.7	47.6	--
Yellow corn, freshly ground	--	--	--	--	--	--	25.0
Oats, finely pulverized	--	--	--	--	--	--	10.0
Wheat middlings	--	--	--	--	--	--	10.0
Wheat bran	--	--	--	--	--	--	5.0
Soybean meal <u>1/</u>	35.0	33.0	30.0	35.0	31.0	33.0	35.0
Dried skim milk	--	--	3.0	--	5.0	--	--
Meat scrap	--	--	2.0	--	--	3.0	--
Fish meal	--	2.0	--	--	--	--	--
Alfalfa leaf meal <u>2/</u>	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Dried whey	--	--	--	5.0	--	5.0	--
Dried distillers' solubles <u>3/</u>	2.7	2.7	1.6	--	--	--	2.7
Steamed bonemeal	2.0	2.0	2.0	2.0	2.0	1.0	2.0
Ground limestone	1.2	1.2	1.3	1.2	1.2	1.3	1.2
Manganized salt <u>4/</u>	.5	.5	.5	.5	.5	.5	.5
Iodized salt <u>5/</u>	.5	.5	.5	.5	.5	.5	.5
Vitamin-A-and-D feeding oil <u>6/</u>	.1	.1	.1	.1	.1	.1	.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

1/, 2/, 3/, 4/, 5/, and 6/ See the correspondingly numbered footnotes on page 2.

Table 3.---Suggested all-mash starting-and-growing diets for turkeys.

Ingredient	Diet 8	Diet 9	Diet 10	Diet 11	Diet 12	Diet 13	Diet 14
	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Wheat, freshly ground	40.00	40.00	43.00	36.00	42.00	--	--
Yellow corn, freshly ground	--	--	--	--	--	22.00	20.00
Oats, finely pulverized	--	--	--	--	--	10.00	10.00
Wheat middlings	--	--	--	--	--	10.00	10.00
Wheat bran	--	--	--	--	--	5.00	5.00
Soybean meal <u>1/</u>	40.00	38.00	35.00	40.00	34.00	28.00	40.00
Dried skim milk	--	--	3.00	--	7.75	--	--
Meat scrap	--	--	2.00	--	--	10.00	--
Fish meal	--	2.00	--	--	--	--	--
Alfalfa leaf meal <u>2/</u>	10.00	10.00	10.00	10.00	10.00	8.00	8.00
Dried whey	--	--	--	7.75	--	--	--
Dried distillers' solubles <u>3/</u>	3.75	3.75	1.75	--	--	3.25	3.75
Steamed bonemeal	5.00	5.00	4.00	5.00	5.00	2.00	4.30
Ground limestone	--	--	--	--	--	.50	.70
Manganized salt <u>4/</u>	.50	.50	.50	.50	.50	.50	.50
Iodized salt <u>5/</u>	.50	.50	.50	.50	.50	.50	.50
Vitamin-A-and-D feeding oil <u>6/</u>	.25	.25	.25	.25	.25	.25	.25
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

1/, 2/, 3/, 4/, 5/, and 6/ See the correspondingly numbered footnotes on page 2.

Table 4.--Suggested all-mash laying diets for chickens.

Ingredient	Diet 15	Diet 16	Diet 17	Diet 18	Diet 19	Diet 20	Diet 21
	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Wheat, freshly ground	68.5	63.0	63.0	67.5	68.5	70.0	--
Yellow corn, freshly ground	--	--	--	--	--	--	38.0
Oats, finely pulverized	--	10.0	10.0	--	--	--	10.0
Wheat middlings	--	--	--	--	--	--	10.0
Wheat bran	--	--	--	--	--	--	10.0
Soybean meal <u>1/</u>	14.0	10.0	10.0	14.0	13.0	11.5	15.0
Dried skim milk	--	--	--	--	3.0	--	--
Meat scrap	--	--	2.0	--	--	2.0	--
Fish meal	--	2.0	--	--	--	--	--
Alfalfa leaf meal <u>2/</u>	8.0	8.0	8.0	8.0	8.0	8.0	7.5
Dried whey	--	--	--	3.0	--	3.0	--
Dried distillers' solubles <u>3/</u>	2.0	1.2	1.2	--	--	--	2.5
Steamed bonemeal	4.0	2.5	2.5	4.0	4.0	4.0	3.2
Ground limestone	2.2	2.0	2.0	2.2	2.2	2.2	2.5
Manganized salt <u>4/</u>	.5	.5	.5	.5	.5	.5	.5
Iodized salt <u>5/</u>	.5	.5	.5	.5	.5	.5	.5
Vitamin-A-and-D feeding oil <u>6/</u>	.3	.3	.3	.3	.3	.3	.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

1/, 2/, 3/, 4/, 5/, and 6/ See the correspondingly numbered footnotes on page 2.

Table 5.---Suggested laying mashes with which an equal weight of grain is to be fed.

Ingredient	Mash 1		Mash 2		Mash 3		Mash 4		Mash 5		Mash 6		Mash 7	
	Percent		Percent		Percent		Percent		Percent		Percent		Percent	
Wheat, freshly ground	35.0		30.0		30.0		32.0		35.0		43.5		--	
Oats, finely pulverized	--		15.0		15.0		--		--		--		10.0	
Wheat middlings	--		--		--		--		--		--		15.0	
Wheat bran	--		--		--		--		--		--		10.0	
Soybean meal <u>1/</u>	32.0		22.0		22.0		32.0		29.0		22.0		32.0	
Dried skim milk	--		--		--		--		8.0		--		--	
Meat scrap	--		--		5.0		--		--		5.0		--	
Fish meal	--		5.0		--		--		--		--		--	
Alfalfa leaf meal <u>2/</u>	15.0		15.0		15.0		15.0		15.0		15.0		15.0	
Dried whey	--		--		--		8.0		--		4.0		--	
Dried distillers' solubles <u>3/</u>	5.0		2.5		2.5		--		--		--		5.0	
Steamed bonemeal	5.4		4.5		4.5		5.4		5.4		4.5		5.4	
Ground limestone	5.4		4.0		4.0		5.4		5.4		4.0		5.4	
Manganized salt <u>4/</u>	1.0		1.0		1.0		1.0		1.0		1.0		1.0	
Iodized salt <u>5/</u>	.6		.4		.4		.6		.6		.4		.6	
Vitamin-A-and-D feeding oil <u>6/</u>	.6		.6		.6		.6		.6		.6		.6	
Total	100.0		100.0		100.0		100.0		100.0		100.0		100.0	

1/, 2/, 3/, 4/, 5/, and 6/ See the correspondingly numbered footnotes on page 2.

Table 6.--A suggested all-mash breeding diet for chickens and turkeys.

Ingredient	Diet 22
	<u>Percent</u>
Wheat, freshly ground	30.0
Yellow corn, freshly ground	23.0
Oats, finely pulverized	10.0
Wheat bran	10.0
Soybean meal <u>1/</u>	6.0
Dried skim milk	2.0
Meat scrap	2.0
Fish meal	2.0
Alfalfa leaf meal <u>2/</u>	7.0
Dried distillers' solubles <u>3/</u>	1.2
Steamed bonemeal	3.0
Ground limestone	2.5
Manganized salt <u>4/</u>	.5
Iodized salt <u>5/</u>	.5
Vitamin-A-and-D feeding oil <u>6/</u>	.3
Total	100.0

Table 7.--A suggested breeding mash with which an equal weight of grain is to be fed--for either chickens or turkeys.

Ingredient	Mash 8
	<u>Percent</u>
Wheat, freshly ground	20.0
Oats, finely pulverized	10.0
Wheat bran	15.0
Soybean meal <u>1/</u>	14.0
Dried skim milk	4.0
Meat scrap	4.0
Fish meal	4.0
Alfalfa leaf meal <u>2/</u>	15.0
Dried distillers' solubles <u>3/</u>	2.7
Steamed bonemeal	3.2
Ground limestone	6.0
Manganized salt <u>4/</u>	1.0
Iodized salt <u>5/</u>	.5
Vitamin-A-and-D feeding oil <u>6/</u>	.6
Total	100.0

1/, 2/, 3/, 4/, 5/, and 6/ See the correspondingly numbered footnotes on page 2.